REMARKS

After the foregoing Amendment, claims 1-20, as amended, are active in the present application. Claims 1, 12, 16 and 18-20 have been amended to add in the word "total" to more particularly describe the bases for the light quality signals in order to more particularly point out and distinctly claim the invention. Support for the amendment can be found throughout the specification and particularly in paragraphs **[0119]** and **[0121]**. No new matter has been added to the application by the foregoing claim amendments.

Rejection Under 35 U.S.C. § 112

Claims 1-7 and 12-20 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point and distinctly claim the subject matter which the Applicants regard as the invention. In particular, the Examiner objected to the phrase "light quantity" which appears in claims 1, 12, 16, 18, 19 and 20. It was the position of the Examiner that the above-quoted phrase was not definite. The Examiner states that the sections of the specification pointed to in the last response do not elaborate on the meaning of the claimed "light quantity generating section" and that he is not clear how the "quantity of light" differs from the "amplitude" as called for in claim 8. Applicants respectfully traverse this rejection for the reasons as set forth below.

Initially, Applicants note that the objected-to phrase does not appear in claim 17 and respectfully request that the rejection with respect to claim 17 should be withdrawn.

Claims 1, 12, 16, and 18- 20 have all been amended to further clarify the light quantity generating sections and their functions. In particular, claim 1, for example, has been amended to clarify that the light quantity generating sections generate the light quantity signals "according to a total light quantity" of either the peripheral or non peripheral part of the received reflected light. The phrase "light quantity" as recited in claim 1 and the other independent claims as stated in the last Response is intended to be given its ordinary meaning, namely, the **"quantity or amount of the light."** The quantity of the light is used to generate current signals which are proportional to the quantity or amount of the light as received by the light detector.

As can be seen when viewing Fig. 2, in the first embodiment, the light source 3 emits light which is reflected off of the optical disc 20 as a reflected light beam 30. As shown in Fig 3, the reflected light beam 30 is applied to a photodetector 4 where it is separated by a beam splitter 47 and two light shielding plates 48 and 49 into an inner light beam 30-2 and an outer peripheral light beam 30-1. As shown in Fig. 4, the photodetector 4 further includes an outer peripheral photodetector 40 which receives the outer peripheral light beam 30-1 and an inner photodetector 41 which receives the inner light beam 30-2. The outer peripheral photodetector 40 is divided into 4 regions A, B, C and D each of which receives a portion of the outer peripheral light beam 30-1 and generates a photocurrent signal (four separate signals) in accordance with the received light quantity in the particular region. The four generated current signals are sent to four current to voltage (I/V) converters 42a, 42b, 42c, and 42d where they are converted to voltage signals which are transmitted to the outer peripheral FE generator 44 and the outer peripheral AS generator 70. The outer peripheral FE generator calculates: (1) the sum of the voltage signals from I/V converters 41a and 42c; (2) the sum of the voltage signals from I/V converters 42b and 42d; and the difference between the sums, thereby generating an outer peripheral FE signal in accordance with the astigmatic method. The outer peripheral AS generator adds the voltage signals from all four of the outer peripheral I/V converters 42a, 42b, 42c and 42d and **generates an outer peripheral AS signal indicating the total light quantity (sum of the light quantity signals from each of the four regions) of the outer peripheral light beam 30-1** (see paragraph **[0121]).** The inner light beam 30-2 is processed in the same manner by the inner photodetector 41, the inner I/V converters 43a, 43b, 43c and 43d, the inner FE generator 45 and the inner AS generator 71. The signals generated by the outer and inner AS generators (total light quantity signals) are shown on Figs 6D and 6E respectively. As can be appreciated when viewing Fig. 4 the areas of each of the regions A, B, C and D of the outer photodetector 40 are greater than the areas of each of the regions A, B, C and D of the inner photodetector 41. This is borne out by the differences in the AS signals of Figs 6D and 6E.

Referring to claim 1, the "first focus signal generating section" is met by the outer FE generator 44, the "second focus signal generating section" is met by the inner FE generator 45, the "first light quantity generating section" is met by the outer AS generator 70 and the "second light quantity generating section" is met by the inner AS generator 71. It is respectfully submitted that it is very well known in the art that a photodetector such as photodetector 40 or photodetector 41 as shown in Fig. 4 of the present application detects the received light and outputs an electrical current signal which varies in accordance with the quantity of the received light. (See, for example, U.S. Patent No. 4,920,527 to Maeda, at column 6, lines 7-26). It is respectfully submitted that in the present application, no other definition is set forth which would in any way differ from the ordinary and usual meaning of the term "light quantity." Thus, the phrase should be interpreted in the usual sense to mean the **quantity or amount** of the light.

The Examiner has correctly noted that the term "light quantity" is not the same as the term "light amplitude," as found, for example, in claim 8. The second embodiment described beginning in paragraph **[0131]** of the present application and as shown in Figs. 8-10 relates to the use of light amplitude signals which are generated by inner and outer FE amplitude measurers 74 and 75. As described in the application at paragraphs **[0133]** through **[0139]** the structure and methods used for determining the "light amplitude signals" are quite different from the structure and methods (described above) for determining the total light quantity signals as recited in claim 1.

It is true that there is a relationship between amount of light focused onto the photodetector and the amplitude of the photocurrent signal generated by the photodetector. However, the characteristics of the amount of light and the amplitude are quite different from each other. "Amount of light" relates to the light before falling onto the photodetector. "Amplitude" of the photocurrent signal relates to the output of the photodetector.

In view of the foregoing discussion, it is respectfully submitted that when the term "light quantity" is given its ordinary meaning as well known in the art, this term is sufficiently definite. It is therefore respectfully submitted that the rejection of claims 1-7 and 12-20 under 35 U.S.C. § 112, second paragraph, should be withdrawn.

Double Patenting Rejections

Claims 1-7, 12-15, 16 and 18 were provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 9 or 13 of co-pending Patent Application No. 10/481,206 (the '206 application) in view of the Maeda patent. Similarly, claim 20 was provisionally rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claim 1 of the copending '206 patent application in view of the Maeda patent further considered with official notice. For the reasons as set forth in detail below, the Applicants respectfully traverse both of the provisional non-statutory obviousness-type double patenting rejections.

1. In the Office Action, the Examiner stated that if the broader set of claims were limited, the double patenting situation may not exist. By the foregoing amendment, the Applicant's have further limited the language of independent claims 1, 12, 16, 18, 19 and 20. Accordingly it is requested that the double patenting rejection should be withdrawn.

2. The present application describes and claims an optical disc drive having very specific processing circuitry. In particular, as shown in Figs. 2 and 4, an apparatus in accordance with the first embodiment of the present invention includes two photodetectors, namely, an inner photodetector 41 for detecting the interior portion of the reflected light beam (30-2 on Fig. 3) and an outer photodetector 40 for detecting the outer portion of the reflected light beam (30-1 on Fig. 3). Claim 1 calls for a light-receiving section (in the disclosed embodiment, the photodetectors 40 and 41) for receiving a peripheral part of the light reflected by the information storage layer of the disc (the outer part of the reflected light beam 30-1) to generate a first detection signal and for receiving a non-peripheral part of the reflected light (the inner part of the reflected light beam 30-2) to generate a second detection signal. As shown in Fig. 2 and as called for in claim 1, a first focus signal generating section (outer FE generator 44) generates a first focus signal based on the first detection signal (peripheral part of the reflected light) and a second focus signal generating section (inner FE generator 45) separately generates a second focus signal based on the second detection signal (non-peripheral part of the reflected light). Separately, a first light quantity generating section (outer AS generator 70) generates a first total light quantity signal based upon the first detection signal (peripheral part of the reflected light) and a second light quantity generating section (inner AS generator 71) separately generates a second total light quantity signal based upon the second detection signal (non-peripheral part of the reflected light). A first normalizing section (72) generates a first normalizing signal by normalizing the first focus signal (from the first or outer focus signal generating section 44) based upon the first light quantity signal (from the first light quantity generating section 70). A second normalizing

section (73) separately generates a second normalizing signal by normalizing the second focus signal (from the second or inner focus signal generating section 45) based on the second light quantity signal (from the second light quantity generating section 71). Finally, a detection section (31) is provided for generating a spherical aberration signal based upon the first and second normalized signals (from the first and second normalizing sections 72, 73).

Claim 9 of the '206 application, while clearly calling for circuitry and components for the purpose of correcting for spherical aberration, does not specify or even remotely suggest the same or substantially the same structural components as called for in claim 1. In the Office Action, the Examiner equates the "first and second light quantity generating sections" of the present claim 1 as the claimed "light receiving means" of claim 9 of the '206 application. However, it is abundantly clear from a brief review of the '206 patent that the "light receiving means" of claim 9 is clearly intended to be the light receiving part 37 which clearly corresponds to the "light receiving section (4 (including 40 and 41))" as called for in claim 1 of the present application and not the light quantity sections as proposed by the Examiner. The Applicants have carefully reviewed claim 9 of the '206 application and can find no structure recited therein which in any way relates to or performs any function which is similar or related to the function of the Applicants' claimed first and second light quantity generating sections (70) and (71). Accordingly, it is respectfully submitted that the Examiner has misinterpreted the scope of claim 9 of the '206 application which does not include any provision for the first and second light quantity generating sections. Moreover, there is no statement, teaching or suggestion in claim 9 of the '206 application which would teach or suggest that the first focus signal (from the first or outer focus signal generating section 44) could be normalized utilizing the first light quantity signal (from the first light quantity generating section 70) and that the second focus signal (from the second or inner focus generating section 45) could be normalized using the second light quantity signal (from the second light quantity generating section 71). It is also respectfully submitted that there is no teaching or suggestion in the Maeda reference regarding the generation of two separate normalized signals utilizing the first and second focus signals **and** the first and second light quantity signals as described above.

Independent method claim 16 is parallel to claim 1 and includes substantially the same features recited in a method format.

Independent claim 12 also calls for a "light quantity detection section" for generating a light quantity signal which is used for normalizing an aberration detection signal. Neither claim 9 nor claim 13 of the '206 application provides any recitation or suggestion regarding the inclusion of a light quantity detection section.

Independent claim 18 is parallel to claim 16 but in a method format.

In the present Office Action the Examiner states that he is not persuaded by the third argument presented in the prior response (repeated above) since he believes that the systems "do overlap". Applicants again respectfully submit that for the reasons presented above, the Examiner has misapplied the claims of the two applications in the comparison chart presented in the current Office Action.

3. With respect to the normalizing structure and processes as called for in claims 1, 12, 16, 18 and 20 the Examiner considers that the claimed features are well known in the art as taught by the Maeda patent. The Applicants respectfully submit that the Maeda patent fails to disclose or teach any such structure or processing steps. In particular, the Maeda patent includes no teaching or suggestion regarding a first normalizing section for generating a first normalizing signal by normalizing a first focus signal based upon a first total light quantity signal and a second normalizing section for generating a second normalizing signal by normalizing a second focus signal based upon a second total light quantity signal.

4. Claim 20 of the present application, like claim 1, calls for first and second focus signal generating sections, first and second light quantity generating sections and first and second normalizing sections as described above with respect to the discussion of claim 1. Again, claim 1 of the '206 application contains no recitation, disclosure or suggestion regarding either the first or the second light quantity generating sections or either the first or second normalizing sections. Moreover, the Maeda reference includes no teaching or suggestion regarding a first normalizing section for generating a first normalizing signal by normalizing a first focus signal based upon a first quantity signal and a second normalizing section for generating a second normalizing signal by normalizing a second focus signal based upon a second quantity signal.

In view of the foregoing discussion, it is respectfully submitted that claims 1-7, 12-15, 16, 18 and 20 are not obvious from any of claims 9, 13 or 1 of the '206 application, either alone or in combination with the Maeda patent and official notice.

It is therefore respectfully submitted that the provisional rejection of these claims on the ground of non-statutory obviousness double patenting should be withdrawn.

35 U.S.C. § 103(a) Rejection

(1) Claims 8-11 and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,774,444 (Shimano *et al.*) considered with the Maeda patent and with either JP 2001-307349 (Takeshi) or US Published Patent Application 2002/0041542 (Sano et al). It is the Examiner's position that the Shimano *et al.* patent discloses the ability of generating a light beam to an optical record medium and reproducing the read information. The Examiner states that the reflected beams are appropriately segregated into an outer and inner peripheral beam but there is no depiction of focusing control. The Examiner further states that the focusing control using such a divided scheme is taught by the Maeda patent and that the Takeshi reference or the Sano et al publication teach the ability of compensating for spherical aberration. The Examiner takes the position that the Maeda patent teaches normalization with respect to Fig. 1 and that the ability of first and second normalization capability is merely one of degree. For the reasons as set forth below, the Applicants respectfully traverse the rejection of these claims.

Independent claims 8 and 17, as well as dependent claims 9-11, relate to the second embodiment shown in Figs. 8-10 and described in the specification beginning at paragraph **[0131]**. In addition to other features, claim 8 calls for a first focus signal generating section (44) for generating a first focus signal based upon the detection signal according to a focusing state of the reflected light in the peripheral part, a second focus signal generating section (45) for generating a second focus signal based on the second detection signal according to a focusing state of the light in the non-peripheral part, a first measuring section (74) for measuring the amplitude of the first focus signal to generate a first amplitude signal, a second measuring section (75) for measuring the amplitude of the second focus signal to generate a second amplitude signal, a first normalizing section (80) for generating a first normalized signal by normalizing the first focus signal based upon the first amplitude signal, and a second normalizing section (81) for generating a second normalizing signal by normalizing the second focus signal based on the second amplitude signal, and a detection section (31) for generating spherical aberration signal based upon the first and second normalized signals.

The Shimano *et al.* patent does not disclose or suggest a focusing control/capability as admitted by the Examiner in paragraph 8 of the Office Action. Accordingly, it is clear that the Shimano *et al.* fails to disclose or suggest the generation of a first normalizing signal by normalizing a first focus signal based on a first amplitude signal or the generation of a second normalizing signal by normalizing a second focus signal based on a second amplitude signal, nor does the Shimano *et al.* patent suggest generating a spherical aberration signal based upon the first and second normalized signals.

The Examiner relies upon the Maeda patent as teaching focusing control using a divided scheme. In the Maeda patent, a single focus error signal is generated based upon multiple signals obtained from a plurality of light-receiving areas of a photodetector. Fig. 1 and the accompanying text of the Maeda patent does not disclose or teach the normalization structure as called for in independent claim 8 or the normalization method steps as called for in independent claim 17. Maeda discloses a focus detection apparatus which provides "a stable focus error signal for a wider range of deviation of light beam center from a center of the photodetector" (col. 3 lines 8-10). In the Maeda scheme, the light beam center deviation range is maximized by selecting the widths b and c of the light reception surface sections B and C and the signal amplification factors β and γ shown in Fig 1 (col. 4 line 57- col. 5 line 22). As long as the light beam center is deviated only within the prescribed range, the focusing error signal FE is accurately detected. However, the Maeda arrangement is optimized only in the focused state. For example, at col. 4 lines 65-68 of the Maeda patent the amount of deviation "dc" of the light beam from the center of the light reception surface is defined only when the light beam is in a focused state. Further, the "dc" is specifically defined when the value of the focus error signal FE does not exceed a permissible maximum value FE_{O} which is set to a value substantially equal to zero in order to maximize an acceptable range for the values of "dc".(See col. 4 line 6 through col. 5 line 1 and Col. 5 lines 13-16). Accordingly, the Maeda scheme is effective in reducing error of the FE signal only in a focused state, i.e. the level of the FE signal can be zero in the focused state in spite of the deviation of the light beam center.

The disclosure and teachings of the Maeda patent are quite different from the specific normalization of the present invention as discussed in detail in paragraph **[0135]** and as recited in claim 8. The Maeda patent does **not** disclose or suggest a process applicable in the defocused state. Therefore in the Maeda apparatus, when the amplitude of the FE signal varies due to changes in the quantity of the reflected light in the defocused state, the FE signal is inevitably affected by defocusing in the same manner as the prior art described in the Background section of the present application. If a spherical aberration signal is generated based on the FE signal of Maeda, the spherical aberration signal has an error in the defocus state. The present invention, as defined in claim 8 avoids this problem by providing first and second (peripheral and non-peripheral) focus signal generating sections for generating first and second focus signals based on separate first and second detection signals, first and second measuring sections for measuring the amplitudes of the first and second focus signals and generating first and second amplitude signals, first and second normalizing sections for generating first and second normalized signals of the first and second focus signals based on the first and second amplitude signals and a spherical aberration section for generating a spherical aberration signal based on the first and second normalized signals and according to a quantity of spherical aberration produced at a focusing position of the light.

Neither the Takeshi publication nor the Sano et al publication make up for the deficiencies of the Maeda patent as discussed above. Accordingly it is respectfully submitted that claim 8 as well as dependent claims 9-11 distinguishes patentably over the four reference combination as proposed by the Examiner. Claim 17 is parallel to claim 8 but in method form so it too distinguishes patentably over the four reference combination for the same reasons as discussed in detail above. It is therefore respectfully submitted that the rejection of claims 8-11 and 17 should be withdrawn.

(2) Claim 19 was rejected under 35 U.S.C. § 103 as being unpatentable over the art as applied with respect to claim 8 and further in view of official notice. In particular, the Examiner has taken official notice that providing a set of instructions on a computer product is well known and is therefore taken official notice thereof. Similarly, claim 20 was rejected under 35 U.S.C. § 103 as being unpatentable over the art as applied to claim 8 and further considered with official notice. The Examiner has taken the position that the existence of a microcomputer is considered well known in the art and is taken official notice thereof. For the reasons as set forth below, the Applicants respectfully traverse the rejections of claims 19 and 20.

Claims 19 and 20 both include the requirements of a first focus signal generated based upon received light in the peripheral part, a second focus signal generated based upon light received in the non-peripheral part, a first light quantity signal generated according to the total light quantity of the peripheral part, a second total light quantity signal generated according to the total light quantity of the non-peripheral part, a first normalizing signal generated based upon the first focus signal and the first light quantity signal, a second normalizing signal generated based upon the second focus signal and the second light quantity signal, and a spherical aberration signal generated based upon the first and second normalized signals. As discussed in detail above with respect to the rejection of claim 8 and 17, the four references cited by the Examiner, whether taken alone or in the combination suggested by the Examiner, do not disclose, teach or suggest the use of two separate portions of the reflected light signal for generating two separate focus signals, and two light quantity signals with the first focus signal being normalized by the first light quantity signal to generate a first normalized signal and the second focus signal being normalized utilizing the second light quantity signal and generating a spherical aberration signal based on the first and second normalized signals according to the quantity of the spherical aberration produced at a focusing position of the light.

Accordingly, for the reasons as set forth in detail above, it is respectfully submitted that claims 19 and 20 distinguish patentably over the four reference combination cited by the Examiner and, therefore, the rejections of these claims should be withdrawn.

Conclusion

In view of the foregoing, it is respectfully submitted that the present application, including claims 1-20, as amended, is in condition for allowance and such action is respectfully solicited.

Respectfully submitted,

YUICHI KUZE, *et al.*

Feb 13 2007 By:
(Date)

LESLIE L. KASTEN, JR.
Registration No. 28,959
AKIN GUMP STRAUSS HAUER & FELD LLP
One Commerce Square
2005 Market Street, Suite 2200
Philadelphia, PA 19103-7013
Telephone: 215-965-1200
Direct Dial: 215-965-1290
Facsimile: 215-965-1210
E-Mail: lkasten@akingump.com

LLK:cb
Enclosures